CLAIMS

1. A hollow fiber membrane module, comprising (a) a cylindrical case, (b) a first sealing body provided for sealing one end of the cylindrical case, (c) a second sealing body provided for sealing the other end of the cylindrical case, (d) a first cap provided for the cylindrical case outside the first sealing body, (e) a second cap provided for the cylindrical case outside the second sealing body, (f) a filtration chamber formed by the inner wall surface of the first sealing body, the inner wall surface of the second sealing body and the inner wall surface of the cylindrical case, (g) a first chamber formed by the inner wall surface of the first cap and the outer wall surface of the first sealing body, (h) a second chamber formed by the inner wall surface of the second cap and the outer wall surface of the second sealing body, (i) a hollow fiber membrane bundle accommodated in the filtration chamber and attached to the first sealing body, with one end of the bundle opened toward the first chamber, and attached to the second sealing body, with the other end of the bundle closed against the second chamber; or attached to the first sealing body, with both the ends of the bundle opened toward the first chamber, the entire bundle being curved in U-shape, (j) a raw water supply port formed in the cylindrical case and opened toward the filtration chamber at a position near the second sealing body, (k) an air discharge port formed in the cylindrical case and opened toward the filtration chamber at a position near

the first sealing body, (l) fluid flow holes for allowing the flow of air and drain, formed in the second sealing body through the second sealing body from the filtration chamber, (m) a filtrate delivery port formed in the first cap and opened toward the first chamber, and (n) a drain port formed in the second cap and opened toward the second chamber.

2. A hollow fiber membrane module, according to claim 1, wherein the minimum lateral cross sectional area defined by the inner circumferential face of the cylindrical case is 150 cm^2 or more and the packing rate of the hollow fiber membranes constituting the hollow fiber membrane bundle at the inner wall surface position of the first sealing body is in a range of 40 to 70%.

3. A hollow fiber membrane module, according to claim 1, wherein at the first sealing body and/or the second sealing body, the hollow fiber membrane bundle attached to the sealing body/bodies is kept apart from the inner wall surface of the cylindrical case by means of a spacer/spacers protruded from the inner wall surface of the cylindrical case.

4. A hollow fiber membrane module, according to claim 3, wherein the protruding height of the spacer(s) from the inner wall surface of the cylindrical case is in a range of 2 to 10 mm.

5. A hollow fiber membrane module, according to claim 4, wherein the face(s) of the spacer(s) on the sealing body side(s) is/are inclined in the direction leaving from the inner wall surface(s) of the sealing body/bodies toward the center of the cylindrical case.

6. A hollow fiber membrane module, according to claim 1, a cover that can be opened and closed to allow the repair of the hollow fiber membranes of the hollow fiber membrane bundle attached to the first sealing body is provided at the crest of the first cap.

7. A hollow fiber membrane module, according to claim 1, wherein the second cap is provided with an air supply port having a restriction opened toward the second chamber and a check valve.

8. A hollow fiber membrane module, according to claim 1 or 2, wherein the cylindrical case is a blow-molded article or thermoformed article made of a thermoplastic resin.

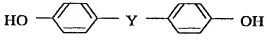
9. A hollow fiber membrane module, according to claim 8, wherein the thermoplastic resin is a polyvinyl chloride resin.

10. A hollow fiber membrane module, according to claim 9, wherein the polyvinyl chloride resin contains a non-lead compound as a thermal stabilizer.

11. A hollow fiber membrane module, according to claim 1 or 2, wherein the cylindrical case is made of an acrylonitrile-X-styrene copolymer (AXS) resin.

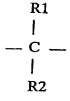
12. A hollow fiber membrane module, according to claim 11, wherein the X denotes ethylene propylene rubber or acrylic rubber.

13. A hollow fiber membrane module, according to claim 1, wherein the resin used to form the first sealing body and/or the second sealing body is an epoxy resin having bisphenol represented by the following general formula



(where Y denotes an alkylene group).

14. A hollow fiber membrane module, according to claim 13, wherein the Y is represented by



(where R1 and R2 denote, respectively independently, a C_nH_{2n+1} (where n denotes 0 or an integer of 2 or more)).

15. A hollow fiber membrane module, according to claim 13 or 14, wherein the epoxy resin is a bisphenol F type epoxy resin.

16. A hollow fiber membrane module, according to claim 13, wherein the epoxy resins penetrates into pore spaces formed in the membrane of the hollow fiber membrane bundle by 1 vol% or more of the volume of the pore spaces.

17. A hollow fiber membrane module, according to claim 1, wherein the filtration chamber is of pressurization type in which it is pressurized at higher than the atmospheric pressure during filtration or backwashing.

18. A hollow fiber membrane module unit, comprising the hollow fiber membrane module described in claim 1 and one more identical hollow fiber membrane modules connected with each other, wherein the respective air discharge ports of the plural hollow fiber membrane modules are connected with a common pipe that is located at a position lower than the respective air discharge ports.

19. A hollow fiber membrane module unit, according to claim 18, wherein the plural hollow fiber membrane modules are mounted in plural rows on a frame.

20. A hollow fiber membrane module unit, according to claim 19, wherein the plural rows of hollow fiber membrane modules are positioned symmetrically about a line or zigzag.

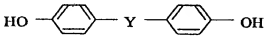
21. A hollow fiber membrane module unit, according to claim 20, wherein the respective raw water supply ports of the plural hollow fiber membrane modules are connected with a common raw water supply pipe, and the filtrate delivery ports of the plural hollow fiber membrane modules are connected with a common filtrate delivery pipe.

22. A hollow fiber membrane module unit, according to claim 20, wherein at least one of the pipes connected with the raw water supply ports, the air discharge ports, the filtrate delivery ports and the drain ports is connected by means of a loose joint at the connection concerned.

23. A method of producing a hollow fiber membrane module as the hollow fiber membrane module described in claim 1, characterized in that when said hollow fiber membrane bundle accommodated in said cylindrical case of 150 cm^2 or more in the minimum lateral cross sectional area defined by the inner wall surface of the cylindrical case is bonded and fastened at the ends thereof using a resin while said first sealing body is formed, respectively by means of stationary potting, the resin is cured with the curing reaction temperature of the resin at the central portion of the formed first sealing body controlled at 120°C or lower.

24. A method of producing a hollow fiber membrane module, according to claim 23, wherein the viscosity of the resin at the start of the stationary potting is in a range of 100 to 5,000 mPa·s.

25. A method of producing a hollow fiber membrane module, according to claim 23, wherein the resin is an epoxy resin having bisphenol represented by the following general formula



(where Y denotes an alkylene group).

26. A method of producing a hollow fiber membrane module, according to claim 25, wherein the Y is represented by

(wherein R1 and R2 denote, respectively independently, C_nH_{2n+1} (where n denotes 0 or an integer of 2 or more)).

27. A method of producing a hollow fiber membrane module, according to claim 26, wherein the resin is a bisphenol F epoxy resin.